

about man having excavated sea-worn caves, and had expressed an opinion about the power of the sea of which he would then feelingly admit that he had been profoundly ignorant.

The pamphlet here noticed did not in itself deserve consideration in these columns. We have made use of it as a type of publication painfully frequent in the literature of science. If in exposing its characteristics we deter any rash and immature aspirant for fame from at once rushing before the world with what he conceives to be his discoveries, we shall have done a service at once to him and to science.

#### CINCHONA PLANTING

*A Handbook of Cinchona Culture.* By Karel Wessel van Gorkom. Translated by Benjamin Daydon Jackson, Sec.L.S. (London: Trübner, 1883.)

*Die Chinarinden in Pharmakognostischer Hinsicht dargestellt.* Von F. A. Flückiger. (Berlin: R. Gaertner, 1883.)

THE rapid extension of cinchona planting in India, Ceylon, and Jamaica will make a translation of Van Gorkom's account of the methods of cultivation and harvesting pursued by him, as Director of the cinchona plantations belonging to the Dutch Government in Java, useful to many who propose to turn their attention to this profitable industry. At present intending planters in British possessions have had little beyond Dr. King's Manual of Cinchona Cultivation (1876) to serve as a guide. In Ceylon the planting community includes many men of first-rate ability, and the singularly energetic journalism of the island speedily ventilates for the common good any fresh idea or point of practice in planting procedure.<sup>1</sup> Indian planters share the benefit of this, while Jamaica has the advantage of possessing in Mr. Morris, a director of its botanical department, who has carried to the West Indies an intimate knowledge of all that is being done in Ceylon. It is not very probable that those who are at present occupied in cinchona enterprise in British possessions will glean much from Van Gorkom's book. Still such a manual will not be without its use for those who have everything to learn about the matter, and, as will be seen, it cannot fail to be interesting to those who watch from an independent point of view the economics of the subject.

The book is handsomely printed and got up—too handsomely, indeed, for workmanlike use, for which its size, that of a small folio, seems particularly unsuited. We must too make a serious protest as to the style of the translation, which, we think, cannot be considered tolerable, even with every allowance for “seeming inelegancies” which Mr. Jackson pleads for in his preface. Take, as a sample, the first sentence which caught our eye:—

“If we trust that this excellent opportunity for fruitful comparisons shall lead to unfettered judgment, still more do we look for, from the impressions received and the enlarged field of view, the scientific work carried on, which has so long been in hand, and most certainly with great completeness and undisputed knowledge of material, will indicate our present standpoint in the domain of quinology” (p. 264).

<sup>1</sup> Of T. C. Owen's Cinchona Planter's Manual, published at Colombo, we know nothing beyond the name.

Now it is quite certain that this is not English, and we have some doubts whether it really conveys any meaning at all. But at any rate we would ask what is the use of translating in this way a work the purpose of which is not literary but essentially utilitarian. There seems, in fact, to be a deep-rooted superstition about the value of so-called fidelity in translating books of mere information. In rendering a foreign language as a philological undertaking, it is often desirable to sacrifice, to some extent, style and form, in order to convey as nearly as may be, the exact force of each word and of each turn of expression. But where, as in a technical treatise, it is only the context we care about, it is exasperating to find the translator exhibiting a would-be scholarly care over the exact reproduction of the vehicle. All we want him to do is to master the meaning and give it to us in clear, straightforward English.

Having said so much by way of criticism we may indicate a few points which we think will be interesting even to some who are not colonial readers of NATURE. A hundred of the three hundred pages of which the volume consists is given up to historical matter regarding the history of *Cinchona* and the development of its culture in Java and in British possessions. All this is an oft told tale, and contains little that will not be found in Mr. Markham's Peruvian Bark (reviewed in NATURE, vol. xxiii. pp. 189-191). An exception must be made, however, as to the interesting account of the commencement of cinchona cultivation in Bolivia. The existence of this enterprise was known, but we have not met with any previous account of it. The Dutch Consul-General reported to his Government:—

“The great event in the agricultural region of Bolivia is the planting of the Bolivian cinchona forests, of which an earnest beginning was made in 1878. . . . The river Mapiro, in the province of Larecaja, department La Paz, has been the centre of the movement, and already the young trees of two years' growth, may be reckoned at from four to five hundred thousand” (p. 17).

Doubt is, however, expressed whether the planting will be maintained in the face of labour difficulties and a possible fall of prices in consequence of increasing exports from the East Indies.

Modern cinchona enterprise in Java has aimed at the production of barks rich in quinine. With the lucky purchase from Mr. Ledger in 1865 of a packet of seeds of the now well-known *Cinchona Ledgeriana*, the Dutch “cinchona culture of the future has entered upon an entirely new phase” (p. 77). About 20,000 of the seeds germinated in Java, and first and last Mr. Ledger received about 24*l.* from the Dutch Government, and “was therewith well content” (p. 91). Fortunately the greater part of the seed originally imported was purchased by a well-known Indian planter, Mr. Money, and some of it seems by private channels to have found its way to the Government plantations in Sikkim. The Dutch having got this valuable kind seem to have managed it with extraordinary intelligence and skill. Men like De Vrij, Moens, and Van Gorkom were well-trained European scientific men and competent chemists. Their object was by continuous selection, controlled by repeated analyses of bark made on the spot to obtain races of *Cinchona Ledgeriana* richer and richer in quinine, and it is a matter of general

notoriety how well they have succeeded.' It is the part of Van Gorkom's treatise dealing with this matter which cinchona planters will be grateful to Mr. Jackson for putting within their reach. Two conditions of success in harvesting good seed are insisted upon.

"For seed saving, the handsomest strongest trees are selected, and especially amongst those whose superior value has been ascertained by chemical examination. Disappointment is inevitable where the eye and botanical characters alone are made use of and trusted to; *the whole issue depends upon the certainty that varieties rich in quinine are exclusively propagated.*

"The choice being made there is something else which must not be neglected; it further behoves us to be perfectly sure that the tree is not fertilised with foreign pollen, that is to say, pollen of an inferior tree or variety" (p. 136).

The last condition cannot be insisted upon too forcibly, notwithstanding that competent botanical opinion can be quoted against it. In their home in South America the different species of *Cinchona* are localised at different points of the Andine chain. Geographical isolation keeps them uncrossed. But where they are brought together in one plantation they hybridise freely. *Cinchona robusta*, which is now widely diffused in India, undoubtedly first originated in Ceylon as a cross between *C. officinalis* and *C. succirubra*.

The aim of the Dutch Government being to produce a commercial bark of high quinine-producing quality, in which they have met with extraordinary success, Van Gorkom is somewhat disposed to criticise the different policy which has been pursued in British India:—

"The Bengal Government . . . makes its cinchona culture serviceable before all things to the wants of its population, and thus only asks itself, how the people and army may be provided with febrifuges on the most advantageous terms" (p. 229).

He sets against this the "well-known fact that not one half of the alkaloids possessed by the raw material are obtained, the greater part being lost." Even supposing, however, that things are as bad as this, and not susceptible of improvement, it is still arguable whether, looking at the cheapness with which red bark can be grown and converted into a febrifuge—the usefulness of which is incalculable—the theoretical waste is a matter for the present of much consequence. But it is unreasonable to suppose that the Bengal methods of extraction are not susceptible of improvement, though they will probably never reach the standard practicable by more expensive methods in Europe. But the objection of wastefulness must be measured by the circumstances. The proprietor of an estate in England who, with a view of bringing a portion of his park into tillage, began by burning the timber upon it, would be considered a madman. But this is habitually done in clearing a piece of tropical forest for cultivation, and as it is not easy to see what else could be done, a complaint as to the waste would not be much to the purpose. It might have been expected that Van Gorkom's sympathies would have centered in the quinine-producing yellow barks which are for the moment most in favour. This, however, is largely due to the unreasonable importance which is attached to quinine

over other cinchona alkaloids. Van Gorkom does not share this prejudice:—

"The conviction has more and more gained ground, that good cinchona barks judiciously applied, frequently do not merely rival quinine, but even surpass it in useful effect" (p. 212).

This point of view is exceedingly important with regard to red bark (*C. succirubra*), which is the easiest of all species to cultivate.

"There is no cinchona bark richer in alkaloids, and though *C. succirubra* is not suitable for the preparation of quinine, because it can only be treated with trouble and much expense, yet it has a preponderance of the secondary alkaloids. No better material for pharmaceutical purposes is known, and on that account its propagation is desirable from every point of view" (p. 100).

High class yellow barks are by no means free in their growth or particularly easy of cultivation. It has been found useful to graft them on *succirubra* stocks, and the practice has been adopted in Sikkim and Ceylon; Van Gorkom gives a useful account of the method adopted in Java.

We must refrain from pursuing many other points which these pages suggest. Two of the concluding chapters deal with the possible synthesis of quinine and the commerce of the barks. As to the former the author has little doubt of success. Two isomeric bodies, chinoline and chinoleine, are known, of which the former is obtained by the distillation of coal tar, the latter by that of quinine. This is thought then to be the clue by which the construction of quinine from coal-tar products will be eventually achieved. But he takes comfort for cinchona planters from two considerations. One is that the synthesis of a vegetable substance when effected does not always result in its practical commercial replacement. The synthesis of alizarine it is found after all does not give the dyer quite what the madder plant gives him. Artificial quinine then may—if ever produced—prove only of interest to the chemist. His other consolation is based on what is said above—that pharmacy can never dispense with the total aggregate extracted products of bark, and the day may be regarded as indefinitely distant when the chemist will be able to replace these any more than such complexes as the contents of our tea- and coffee-pots.

As to commerce it is interesting to learn that London is the most important market for bark, and Paris next. We fear, however, from statistics obtained from another source, that this country has no corresponding lead in the production of the manufactured products, only about 10 per cent. of the quinine of the world being made in England. Yet Van Gorkom states emphatically that "the consumption at the present day of cinchona and its alkaloids, merely represents a paltry fraction of the quantity which will be required to satisfy the prescription of humanity in every country, and among all classes and races of men" (p. 236).

We have left ourselves but little space to notice Prof. Flückiger's handy and concise work, which, though of importance to cinchona planters, is primarily a pharmaceutical study of the subject. The bark of *Cinchona succirubra* has been recently adopted as the official bark of the German Pharmacopœia—a fact of no small importance to planters in British possessions, when it is remem-

<sup>1</sup> Acknowledgment must be made of the striking liberality with which the Dutch Government officials have always placed what they could spare of their selected seed at the disposal of planters in other countries.

bered how enormous is the extent of its cultivation in their hands. It is this fact which has won it its official status, as though poor in quinine its quality is tolerably uniform, and being easily grown its supply can always be depended on. Prof. Flückiger gives a figure of the plant as well as of *Cinchona Ledgeriana*—the quinine bark *par excellence*—and of *Remijia pedunculata*, one of the sources of the *Cinchona cuprea* which has of late years been poured into European markets from South America

### MARINE SURVEYING

*A Treatise on Marine Surveying.* Prepared for the use of younger Naval Officers, by the Rev. J. L. Robinson, B.A., Royal Naval College. (London: Murray, 1882.)

THIS book has been written apparently with the view of enabling young naval officers to cram themselves sufficiently to pass the examination in surveying at the Royal Naval College, and it must be conceded displays considerable industry on the part of Mr. Robinson, who has evidently taken pains to go through the examination papers on surveying from their commencement, to see what questions are usually asked, and in what form they could be best answered; and has besides consulted a large number of works bearing on surveying, a list of which he gives at the commencement of his treatise; but we confess we are much disappointed that with such excellent materials, so poor a result should have been produced, for, with the exception of the chapter on tides, which in its way is excellent, the work is of very little value, and rather reminds us of that treatise of—

“The young lady of Buckingham  
Who wrote about geese and stuffing ‘em,  
But found out one day  
She’d neglected to say  
A word in her book about plucking ‘em.”

Mr. Robinson says in his preface “he has had no intention to write a handbook for the use of the practical surveyor,” and that “such an intention might fairly be regarded as an impertinence in one who has never been engaged in the practical work of the profession,” but that he has had rather “the examination room and its requirements before him.” But did it not strike Mr. Robinson that the practical surveyor selected to examine the candidates might ask questions upon which he has neglected to touch, and that consequently his treatise might fail to ensure success in the “examination room,” notwithstanding the valuable hints he has received from Staff-Commander Johnson and his friend of great experience as a first-class surveyor?

The first chapter consists of extracts from Admiralty publications, but we recommend the officers at the college to consult those publications for themselves, more especially the Admiralty list of abbreviations, as the illustrations in this work give a poor representation of the symbols and signs used by the draughtsman and engraver.

The second chapter, on the Construction and Use of Scales, and the sixth, on Instruments, are derived principally from Heather. Here again we prefer the original to the copy.

The third chapter, on Laying off Angles, merely contains a brief description of the methods of plotting angles

by chords with a small radius. On this we would remark that the real value of plotting angles by chords consists in their being plotted with long radii, as any practical draughtsman could have informed the author.

The fourth chapter is a most elaborate analysis of the method of Fixing a Position by Angles, &c. Surveyors take sextant angles, principally, to fix their positions when sounding, and invariably use the station pointer for that purpose; this chapter therefore seems to us to be firing a 12-ton gun at a sparrow.

The fifth chapter, on Charts and Chart Drawing, is rather a description of the method of map construction, and contains some mis-statements. Evidently Mr. Robinson is not well acquainted with the mode of constructing charts at the Admiralty or by surveyors, as he states in one paragraph that circumpolar charts are usually constructed on the gnomonic projection, whereas we are not acquainted with one Admiralty circumpolar chart on this projection. It is true a diagram is published to facilitate the practice of great circle sailing but no circumpolar chart.

The fact is all marine surveyors project their work on the gnomonic projection, and as the smallest scale in use is an inch to a mile, it is evident that the errors of this projection are very slight, as the largest sheet of paper that can be worked at conveniently is about six feet square. When the original surveys arrive at the Admiralty the Hydrographer decides in what form they shall be engraved and published. If the surveys are plans of harbours, they are usually published on the gnomonic projection (as they were originally drawn); if the survey is of a coast, or to be incorporated in a coast, or general sheet, it is transferred to the mercatorial projection, for which the meridional parts of the spheroid are used. Charts of the circumpolar region are however published on an arbitrary projection, in which the parallels of latitude are drawn as concentric circles at equal distances from the pole.

Chapter seven is on Base Lines. Now base lines are principally of use to the marine surveyor as the quickest method of starting his work, which, when it extends over a large area, almost invariably depends eventually for its scales on astronomical observations.

Mr. Robinson states that it is impossible to fix the position *exactly* by means of a sextant. Here we must differ from him, and will give one instance to the contrary. When the question of the boundary between the United States and British North America was decided, and the 49th parallel was fixed on, Admiral Sir George Richards then in command of H.M. surveying vessel *Plumper*, at Vancouver’s Island, was directed to ascertain the position of this boundary line on the western seaboard of North America. This he did with a sextant, and buried a mark in the ground on the position of the 49th parallel as ascertained by himself. The Americans sent a party for the same purpose with a zenith sector and altazimuth and when they had fixed the position of the 49th parallel by these means, the difference between the two results was found to be less than 100 feet! It is of course as well that nautical surveyors should know the various methods employed in obtaining accurate bases for geodetical measurements, but for marine surveying the same nicety is not required as in measuring the arc of a meridian, and it cannot be too often impressed on the mind